

EXHIBIT 202

REDACTED

From: [REDACTED]
To: [REDACTED]
Subject: Re: [REDACTED]
Cc: [REDACTED]
[REDACTED]
[REDACTED]

I created a couple more plots, one for all pubs for [REDACTED], and one for all buyers for [REDACTED]. The red line in each plot is $y = x$.
[REDACTED]

On Mon, Feb 22, 2016 at 9:02 AM, [REDACTED] wrote:

[REDACTED]
Do we see this behavior for other buyers? Do you have to condition on a web property, or would this be visible to a buyer if they were looking across all web properties?

[REDACTED]
On Mon, Feb 22, 2016 at 8:13 AM, [REDACTED] wrote:

+ [REDACTED] to merge on another thread discussing devising a statistical test for detecting bid price correlation.

- [REDACTED]

On Mon, Feb 22, 2016 at 11:02 AM, [REDACTED] wrote:

We were waiting for [REDACTED] to come back for the response. I am not sure how to formalize the response and make sure it does not produce negative PR. At the same time, you don't want to say sth. that gives a feeling that you are hiding details on purpose. I think we should admit that this happened to some experiments and Can we say sth like: "We were doing an experiment that we believe caused this pricing behavior."

[REDACTED] 3 further comments:

- 1) it would be good to add a note in the document about the lift before and after this change (which should be the same)
- 2) In your doc, it's good to say why we didn't go with a simple uniform noise...
- 3) if we want to run experiments in which we go away from first-price in the dynamic region, let's add this randomness for the pricing rule there as well.

[REDACTED]
On Mon, Feb 22, 2016 at 10:47 AM, [REDACTED] wrote:

+ [REDACTED]

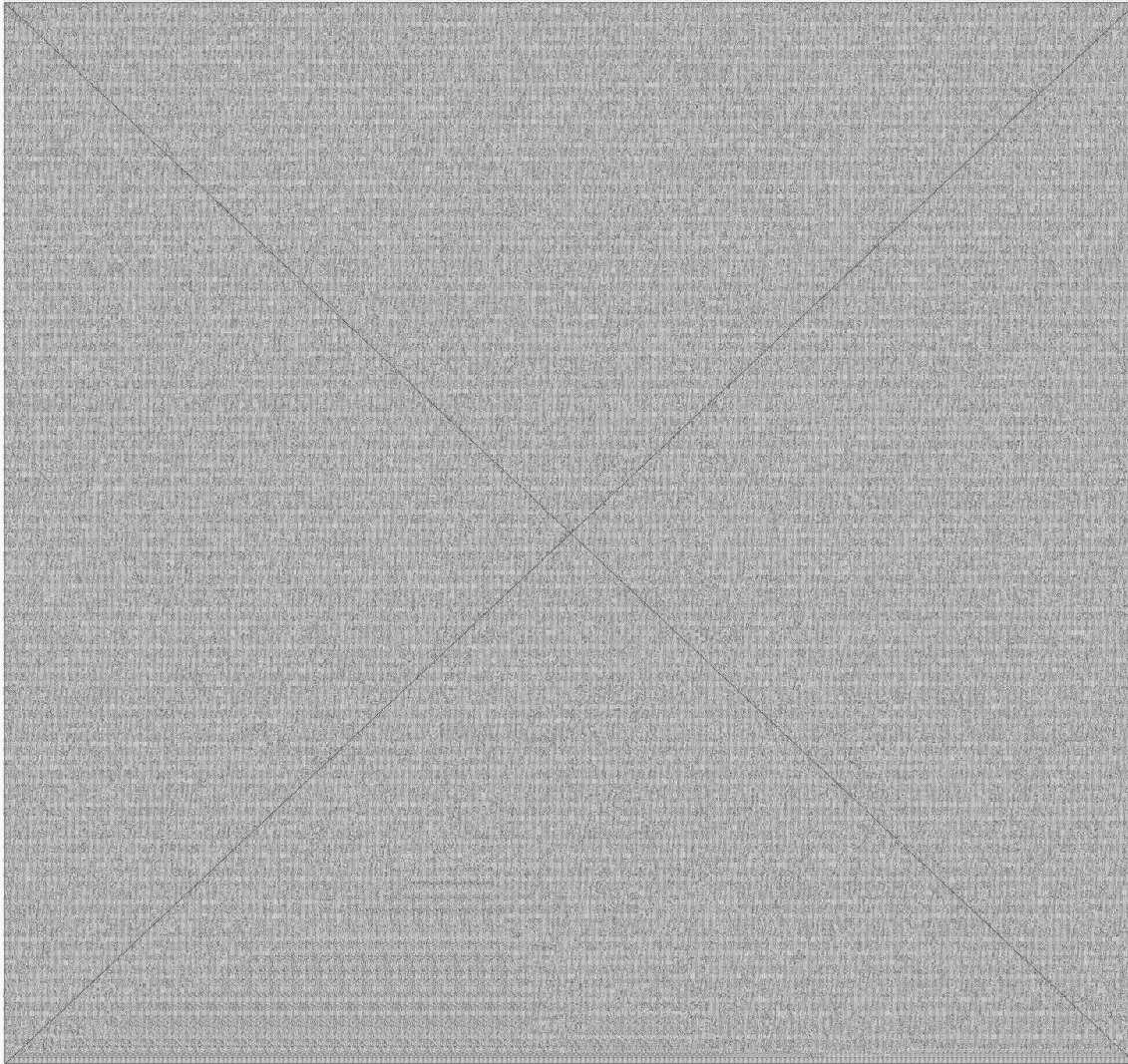
On Mon, Feb 22, 2016 at 10:41 AM, [REDACTED] wrote:

Today we re-started experiments [REDACTED]. If they look good, I'll ramp up to 5% as before.

I also worked on trying to reproduce [REDACTED]
[REDACTED].

We simulate [REDACTED]
[REDACTED]

██ In the first plot you can see bid vs price and there are indeed those very pronounced lines.



Next we simulate using the randomized threshold in the next figure. The effect is no longer there. Or to be more precise, it is not so visually apparent. It would be great to devise some statistical test to catch such correlations whenever they exist (even if they are not visually apparent).

Agree [REDACTED] -- we should ramp down

On Tue, Feb 16, 2016 at 9:52 AM [REDACTED] wrote:

Let's also ramp down the [REDACTED]

- [REDACTED]

On Tue, Feb 16, 2016 at 9:43 AM, [REDACTED] wrote:

I am on it, [REDACTED] I'll also try to first reproduce [REDACTED] plot so that we can check that after the change this line is no longer there.

On Tue, Feb 16, 2016 at 7:49 AM, [REDACTED] wrote:

[REDACTED] can you go ahead and spin up a experiment with the random threshold?

On Mon, Feb 15, 2016 at 11:34 PM [REDACTED] wrote:

I am just wondering if by the time DRS v1 launched if there were any complaints about the new soft floors or if the dynamic range was too narrow to be noticeable.

On Mon, Feb 15, 2016 at 1:44 PM, [REDACTED] wrote:

They certainly routinely do this for AdX and other exchanges, I've seen examples of them "exposing" soft floors on other exchanges. They've told me they aim to "boost" "clean" exchanges, without explaining exactly what that means. We should understand this better and talk to buyside before proceeding with rampup.

On Mon, Feb 15, 2016 at 5:57 PM, [REDACTED] wrote:

+ [REDACTED]

On Mon, Feb 15, 2016 at 12:53 PM, [REDACTED] wrote:

It would be good to understand why they don't observe or complain about the full fist-pricing in the dynamic region? If it's b/c of the smaller margin/increase, we can easily change the pricing and get the benefit of DRS V2 by putting a cap of at most 10% or 20% increase over max(res, 2nd price).

Best,
Vahab

On Mon, Feb 15, 2016 at 12:22 PM, [REDACTED] wrote:

Interesting analysis. I bet they do this type of analysis for other exchanges that routinely run such hybrid auctions. As [REDACTED] said, the way to get rid of all such correlations in data is to add "randomness" around the pricing rules we imposed, i.e., instead of going half-way in either case, we should add randomness so that it is half-way on average.

Best,
[REDACTED]

On Mon, Feb 15, 2016 at 11:51 AM, [REDACTED] wrote:

This is very interesting to see that DRS v2 effects are visible outside. I do believe this is DRS v2, but I think this is not due to half_way pricing in the dynamic region. I believe the culprit is buyer debt recollection. When a buyer has debt and he bids above the floor price, then we recollect an amount up to half of the bid price gap (which is exactly $(\text{floor} + \text{bid}) / 2$). There are two reasons why I think this is the effect and not the pricing in the dynamic region:

* the correlation goes from bids 5 to 10. In the second plot it goes from 4 to 10, which is more than twice. The dynamic region effect would create such lines only for stretches of r to $r * 1.25$.

* the bid price correlations in DRS v1 (bid = price in the dynamic region) are stronger and [REDACTED] is not complaining about them. Or are they? If not, then I'd say that they are not very sensitive to correlations in the dynamic region (since it is such a short stretch of bids), but they are sensitive to correlations for long stretches.

Experiments we are running: [REDACTED]

Question: did [REDACTED] (or others) complained about unfairness in DRS v1? Did they detect bid / price correlation then?

Ideas to fix it: when we recollect debt, instead of capping at the midpoint of the bid price gap, cap at a random threshold in the bid - price gap. This way they won't see this correlation. In long term, we should think of all possible ways such correlations can be detected.

On Sun, Feb 14, 2016 at 1:48 PM, [REDACTED] wrote:

+ [REDACTED]

To me, this looks like a case of DRSv2 with HALF_WAY price recovery.

I believe we're running a 1% experiment [REDACTED]

On Sat, Feb 13, 2016 at 8:30 PM, [REDACTED] wrote:

+ [REDACTED]

Timing is odd too, since we just discussed RPO with [REDACTED]. $(\text{Floor} + \text{Bid}) / 2$ looks wrong though, and I don't think we would see this with RPO. DRS maybe?

On Fri, Feb 12, 2016 at 3:06 PM, [REDACTED] wrote:

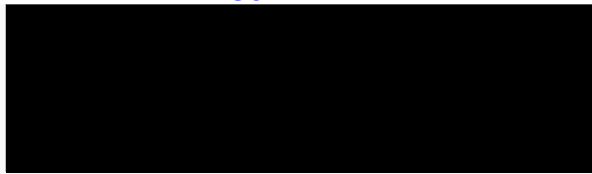
Hey [REDACTED],

[REDACTED] as they think they found traces of dynamic flooring in our algorithm.

Data is very light, and to be honest, it looks quite linear (too linear?) to be RPO. Nevertheless, I come for guidance as this a subject we probably need to communicate carefully on.

Thanks!

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----- Forwarded message -----

From: [REDACTED]
Date: Fri, Feb 12, 2016 at 3:04 PM
Subject: Re: [REDACTED] Dynamic Pricing on [REDACTED]
To: [REDACTED]
Cc: [REDACTED]

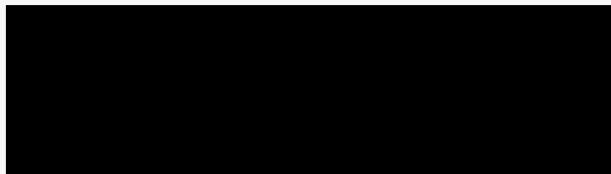
Hey guys,
let me check with PM & Eng. on this. However, PM is leaving today for 1 week hols.

TBH, it looks way too regular to be RPO to me (and [REDACTED] but we could be wrong.

In the meantime, better not say much, and if they push you to answer, that we're investigating (and that Monday is off for us :)).

Cheers,

--
[REDACTED]



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On Fri, Feb 12, 2016 at 11:52 AM, [REDACTED] > wrote:

Hey [REDACTED]
[REDACTED] and I were looking at the below email from [REDACTED] On the graph below, you can see a correlation between bid and close price with a slope of 1/2 (for certain inventory). Essentially it looks like they've discovered our reserve price optimization feature and are asking questions.

Thoughts on how to handle this?

Cheers
[REDACTED]

----- Forwarded message -----

From: [REDACTED]
Date: Fri, Feb 12, 2016 at 4:16 PM
Subject: Re: [REDACTED] Dynamic Pricing on [REDACTED]
To: [REDACTED]
[REDACTED]